

REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Claims 1, 3-5, 7, 9 and 10 were pending in this application when examined.

Claim 1 has been amended to delete the term “non-surfactant” and to incorporate the phosphoric acid ester compounds of claim 3. As a result, claims 3, 7 and 9 have been cancelled.

Claim 1 has also been amended to include a “plasticizer” in the resin composition, and to limit the plasticizer to “triethylene glycol di-2-ethylhexanoate”. Support for these amendments can be found on page 9, lines 1-3, page 10, line 9 and Examples 1-6 of the specification.

Claim 1 has also been amended to recite “the amount of the plasticizer is 20 to 70 parts by weight to 100 parts by weight of the polyvinyl acetal resin”. Support for this amendment can be found on page 10, lines 23-25 of the specification.

Claim 4 has been amended to correspond with the amendments to claim 1.

I. Claim Rejection Under 35 U.S.C. § 112

The Examiner has rejected claims 1, 3-5, 7, 9 and 10 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, because of the term “non-surfactant”. This rejection has been rendered moot in view of the above-discussed claim amendments to delete “non-surfactant”. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

II. Claim Rejection Under 35 U.S.C. § 103

The Examiner has rejected claims 1, 3-5, 7, 9 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Fisher et al. (US 2003/0054160) in view of Fukatani et al. (US 2004/0234778), Coaker et al. (US 3,841,890) and, as evidenced by, William et al. (US 2006/0133978), Imachi et al. (US 2006/0019153) and Matsuzaka et al. (U.S. 4,917,996). As applied to the amended claims, Applicant respectfully traverses the rejection.

A. **The Features of the Claimed Invention**

1. **Claim 1**

The color interlayer film for laminated glass of claim 1 has the following features:

- (i) a resin composition containing a polyvinyl acetal resin, a coloring agent, an infrared ray shielding agent, and a plasticizer;
- (ii) the resin composition **further contains at least one phosphoric acid ester compound selected from the group consisting of trioctyl phosphate, triisopropyl phosphate, tributoxyethyl phosphate, tricresyl phosphate, and isodecylphenyl phosphate;**
- (iii) the content of the phosphoric acid ester compound is **5 parts by weight or less to 100 parts by weight** of the polyvinyl acetal resin; and
- (iv) the plasticizer is **triethylene glycol di-2-ethylhexanoate** and the amount of the plasticizer is 20 to 70 parts by weight to 100 parts by weight of the polyvinyl acetal resin.

2. **The Effects of the Claimed Invention**

By employing the specific combination of features (i) to (iv), the color interlayer film for laminated glass of claims 1 and 4, and the laminated glass using the film of claims 5 and 10, are excellent in infrared ray shielding properties and have **resistance against whitening, even in the case of moisture absorption**, while maintaining the basic properties of an interlayer film for laminated glasses or as a laminated glass (see page 3, line 23 to page 4, line 3 of the specification).

These superior effects are demonstrated by the examples in the specification. For instance, Table 2 of the specification shows the haze value measured **after 24 hours from the time when the color interlayer films were immersed in water at 23°C** as they were or while being sandwiched with clear glass (see page 16, lines 9-13 of the specification). The haze value of the color interlayer films for laminated glass of Working Examples 1-6 was quite low as compared with that of the Comparative Example (see Table 2). **The Comparative Example corresponds to the interlayer film of Fisher et al.**, because it does not have the specific phosphoric acid ester compounds recited in claim 1, as discussed below. Thus, the Working Examples demonstrate that the color interlayer films for laminated glass of the claimed invention have **excellent resistance against whitening even in the case of moisture absorption** (such as in a highly humid atmosphere).

The haze values in Table 2 of the specification are shown below. Note that the value in parenthesis is the haze value of the Working Example minus the haze value of the Comparative Example.

Table 2

Example No.	Haze value (AVE)	
	Film alone	Sandwiched by clear glass
1	42.9 (-46.7)	31.3 (-57.6)
2	38.0 (-51.6)	35.0 (-53.9)
3	39.0 (-50.6)	30.8 (-58.1)
4	39.9 (-49.7)	27.3 (-61.6)
5	41.6 (-48.0)	33.6 (-55.3)
6	45.7 (-43.9)	36.2 (-52.7)
Comparative Example	89.6	88.9

Value in parenthesis = (haze value of Working Example)-(haze value of Comparative Example)

The interlayer film of Working Examples 1-6 contain 0.014 parts by weight trioctyl phosphate (representative of a phosphoric acid ester compound according to claims 1 and 4) to 100 parts by weight of polyvinyl butyral resin. On the other hand, the interlayer film of the Comparative Example does not contain trioctyl phosphate, and thus does not contain a phosphoric acid ester, as required by claim 1 of the present application (see page 13, line 26 to page 14, line 5 and Table 1 on page 15 of the specification).

As shown in Table 2 above, in the case of the interlayer film alone, the haze values of Working Examples 1-6 was 38.0 to 45.7, whereas the haze value of the Comparative Example was 89.6. In the case of the interlayer film sandwiched between two clear glass plates (corresponding to claims 5 and 10), the haze values of Working Examples 1-6 was 27.3 to 36.2, whereas the haze value of Comparative Example was 88.9.

Accordingly, in the interlayer film alone, the haze value of the Working Examples decreased by 43.9 to 51.6, as compared to the Comparative Example (a decreasing rate of 49.0 to 57.6%).

The decreasing rate (%) was calculated according to the following formula:

$$\frac{((\text{haze value of Comparative Example}) - (\text{haze value of Working Example}))}{(\text{haze value of Comparative Example})} \times 100$$

Furthermore, in the interlayer film sandwiched between two clear glass plates, the haze value of Working Examples 1-6 decreased by 52.7 to 61.6 (**a decreasing rate of 59.3 to 69.3%**), as compared to the Comparative Example.

In other words, the claimed interlayer film alone improves the effect of preventing against whitening in the case of moisture adsorption by **49.0 to 57.6%** over the Comparative Example (an interlayer film that does not contain the specific phosphoric acid ester compound recited in claim 1). Furthermore, the claimed interlayer film sandwiched between two clear glass plates improves the effect of preventing against whitening in the case of moisture adsorption by 59.3 to 69.3% over the Comparative Example.

As discussed above, the interlayer film that does not contain the specific phosphoric acid ester compound according to claim 1 corresponds to the interlayer film of the closest prior art reference, Fisher et al. Therefore, the claimed invention has superior and unexpected results over the closest prior art.

B. The Difference Between the Claimed Invention and Fisher et al.

As discussed above, claim 1 recites a resin composition that “further contains a phosphoric acid ester compound at a ratio of 5 parts by weight or less to 100 parts by weight of the polyvinyl acetal resin” (feature (iii)), and “the phosphoric acid ester compound is at least one selected from the group consisting of trioctyl phosphate, triisopropyl phosphate, tributoxyethyl phosphate, tricresyl phosphate and isodecylphenyl phosphate” (feature (ii)).

Fisher et al. do not disclose or suggest the specific phosphoric acid ester recited in claim 1, and do not disclose or suggest the use of the claimed phosphoric acid ester as a dispersion stabilizer in the claimed amount. Thus, Fisher et al. do not disclose or suggest features (ii) and (iii) of the claimed invention.

In addition, the reference fails to disclose or suggest the specific combination of features (i) to (iv) of the claimed invention.

C. The Difference Between the Claimed Invention and Fukatani et al.

1. The Dispersion Stabilizer in Fukatani et al.

Fukatani et al. do not specifically disclose the phosphoric acid ester compounds recited in claim 1 as a dispersion stabilizer. The reference clearly teaches “polyphosphate salt” as a dispersion stabilizer in the working examples (see paragraphs [0127], [0157], [0167] and [0190]). It is common knowledge in the art that polyphosphate salt is different from the phosphoric acid ester compounds recited in claim 1.

2. The Disclosure of Tributoxyethyl Phosphate, Isodecylphenyl Phosphate and Triisopropyl Phosphate in Fukatani et al.

Applicant acknowledges that Fukatani et al. disclose tributoxyethyl phosphate, isodecylphenyl phosphate and triisopropyl phosphate in paragraph [0066]. However, these phosphoric acid ester compounds are clearly taught as “an organic phosphoric acid-based **plasticizer**”, rather than a dispersion stabilizer.

The reference teaches, “**The composition amount of the plasticizer is preferably 20 to 60 parts by weight** per 100 parts by weight of the polyvinylacetal resin...The composition amount is **more preferably 30 to 50 parts by weight**” (see paragraph [0068], emphasis added).

Accordingly, Fukatani et al. teach that the interlayer film may contain tributoxyethyl phosphate, isodecylphenyl phosphate and triisopropyl phosphate **as a plasticizer** at a ratio of preferably **20 to 60 parts by weight, more preferably 30 to 50 parts by weight** of the polyvinylacetal resin.

On the other hand, claim 1 recites a resin composition that includes triethylene glycol di-2-ethylhexanoate **as a plasticizer**, and “**further contains** a phosphoric acid ester compound at a ratio of **5 parts by weight or less to 100 parts by weight** of the polyvinyl acetal resin”.

Thus, Fukatani et al. do not disclose or suggest using the phosphoric acid ester compound recited in claim 1 at a ratio of **5 parts by weight or less to 100 parts by weight** of the polyvinylacetal resin as a dispersion stabilizer.

3. The Combination of Features (i) to (iv) of the Claimed Invention

In view of the foregoing, Fukatani et al. do not disclose or suggest the specific combination of (i) a resin composition containing a polyvinyl acetal resin, a coloring agent, an infrared shielding agent, and a plasticizer, (ii) at least one phosphoric acid ester compound selected from the group consisting of trioctyl phosphate, triisopropyl phosphate, tributoxyethyl

phosphate, tricresyl phosphate and isodecylphenyl phosphate; (iii) a phosphoric acid ester compound at a ratio of 5 parts by weight or less to 100 parts by weight of the polyvinyl acetal resin; and (iv) triethylene glycol di-2-ethylhexanoate as plasticizer.

Accordingly, Fukatani et al. does not disclose or suggest the specific combination of features (i) to (iv) of the claimed invention.

D. The Difference Between the Claimed Invention and Coaker et al.

Coaker et al. is silent regarding an infrared ray shielding agent, such as LaB₆ ITO and ATO. Furthermore, the plasticizer of Coaker et al. is a blend of a phosphate plasticizer and a diester of an aliphatic dicarboxylic acid. Thus, the plasticizer in the reference is clearly distinguished from the specific plasticizer recited in claim 1 of “triethylene glycol di-2-ethylhexanoate”.

Accordingly, Coaker et al. fail to disclose or suggest the specific combination of features (i) to (iv) of the claimed invention.

E. William et al., Imachi et al. and Matsuzaka et al.

None of these references disclose or suggest the specific combination of features (i) to (iv) of the claimed invention.

F. The Specific Combination of Features (i) to (iv) of Claim 1 Would Not Have Been Obvious Over the Cited References

For the reasons discussed above, none of the references teach the use of the specific combination of features (i) to (iv) of the claimed invention.

Accordingly, a person of ordinary skill in the art would not have arrived that the specific combination of features (i) to (iv) with any reasonable expectation of success. Thus, the claimed invention would not have been obvious over the references.

G. The Examiner's Position Is Erroneous

The Examiner asserts that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize Fukatani et al. and Coaker et al. in the invention of Fisher et al. to disperse LaB₆, ITO and/or ATO in a plasticizer containing a phosphoric acid ester compound “as dispersion stabilizer to prevent haze and for compatibility” (see Office Action, page 5, lines 5-10, emphasis added). Applicant respectfully disagrees.

1. The Effects of Fisher et al.

Fisher et al. describe in paragraph [0012] that “the invention is a laminate transparent to

visible light and absorbing light in the infrared region of the spectrum”. However, the reference fails to disclose or suggest a color interlayer film for laminated glass having excellent resistant to whitening of the interlayer film part, even in the case of moisture absorption.

Furthermore, as described above, the claimed invention has superior and unexpected results over Fisher et al., as demonstrated by the differences in haze values between the Working Example and the Comparative Example (corresponding to Fisher et al.).

2. The Effects of Fukatani et al.

With regard to the dispersion stabilizer, Fukatani et al. describe in paragraph [0097] that “The content of the dispersion stabilizer is preferably 0.0005 to 5.0 parts by weight per 100 parts by weight of the polyvinylacetal resin. If the content is less than 0.0005 parts by weight, almost no effect by the dispersion stabilizer can be obtained, whereas, if it exceeds 5.0 parts by weight, foams are formed during the formation of an interlayer film or after being fabricated into a laminated glass, foams may be formed or the adhesion force between the interlayer film and glass may be increased too much.”

However, Fukutani et al. fail to disclose or suggest that a dispersion stabilizer prevents haze in an interlayer film **even in the case of moisture absorption**.

Further, Fukatani et al. teach in paragraph [0016] that “An object of the present invention is to provide an interlayer film for a laminated glass and a laminated glass, which are **superior in transparency, heat shield property, electromagnetic wave permeability and weatherability**” (emphasis added).

These effects are quite different from the effects of the claimed invention. The reference does not disclose or suggest a color interlayer film for laminated glass having excellent resistance to whitening of the interlayer film part, even in the case of moisture absorption, as in the present application.

Therefore, a person of ordinary skill in the art would have had no reasonable expectation of success of obtaining a color interlayer film for laminated glass having excellent resistance to whitening of the interlayer film part, even in the case of moisture absorption, from the disclosure of Fukitani et al.

3. The Effects of Coaker et al.

Coaker et al. describe that “the interlayers prepared using the plasticizer blends of the present invention exhibit excellent edge stability” (see col. 1, lines 41–44). However, this effect

is quite different from the effects of the claimed invention. The reference does not disclose or suggest a color interlayer film for laminated glass **having excellent resistance to whitening of the interlayer film part**, even in the case of moisture absorption, as in the claimed invention.

Therefore, a person of ordinary skill in the art would have had no reasonable expectation of success of obtaining a color interlayer film for laminated glass having excellent resistance to whitening of the interlayer film part, even in the case of moisture absorption, from the disclosure of Coaker et al.

Accordingly, none of references teach or suggest that the color interlayer film for laminated glass is **resistant against whitening, even in the case of moisture absorption**. Therefore, the effects of the claimed invention are quite different from the effects of the cited references, and a person of ordinary skill in the art would have had no reasonable expectation of success of obtaining a color interlayer film for laminated glass having excellent resistance to whitening of the interlayer film part, even in the case of moisture absorption, from the combination of the cited references.

Thus, the claimed invention would not have been obvious over the combination of the cited references.

H. The Unexpected Results of the Claimed Invention

Moreover, as shown in Table 2 and discussed above, the claimed invention has unexpected results in terms of preventing against whitening in the case of moisture adsorption over the closest prior art (Fisher et al.).

The claimed interlayer film alone improves the effect of preventing against whitening in the case of moisture adsorption by **49.0 to 57.6%** over the Comparative Example (an interlayer film that does not contain the specific phosphoric acid ester compound recited in claim 1); and the claimed interlayer film sandwiched between two clear glass plates improves the effect of preventing against whitening in the case of moisture adsorption by **59.3 to 69.3%** over the Comparative Example.

Therefore, even if a *prima facie* case of obviousness had been established by the Examiner, the claimed invention has unexpected results over the closest prior art reference, and the rejection should be withdrawn.

Therefore, claim 1 would not have been obvious to a person of ordinary skill in the art over the cited references.

Claims 4, 5 and 10 depend directly or indirectly from claim 1, and thus also would not have been obvious over the references.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Submission of Verified English Translation of Japanese Priority Application

Applicant submits herewith a verified English translation of Japanese Priority Application No. 2005-054700, filed February 28, 2005. Thus, Applicant has perfected the claim to foreign priority under 35 U.S.C. § 119, and respectfully requests acknowledgment of the perfected claim in the next Official Action.

IV. Conclusion

For these reasons, Applicant takes the position that the presently claimed invention is clearly patentable over the applied references.

Therefore, in view of the foregoing amendments and remarks, it is submitted that the rejections set forth by the Examiner have been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

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Attachment: Verified Translation of Priority Document